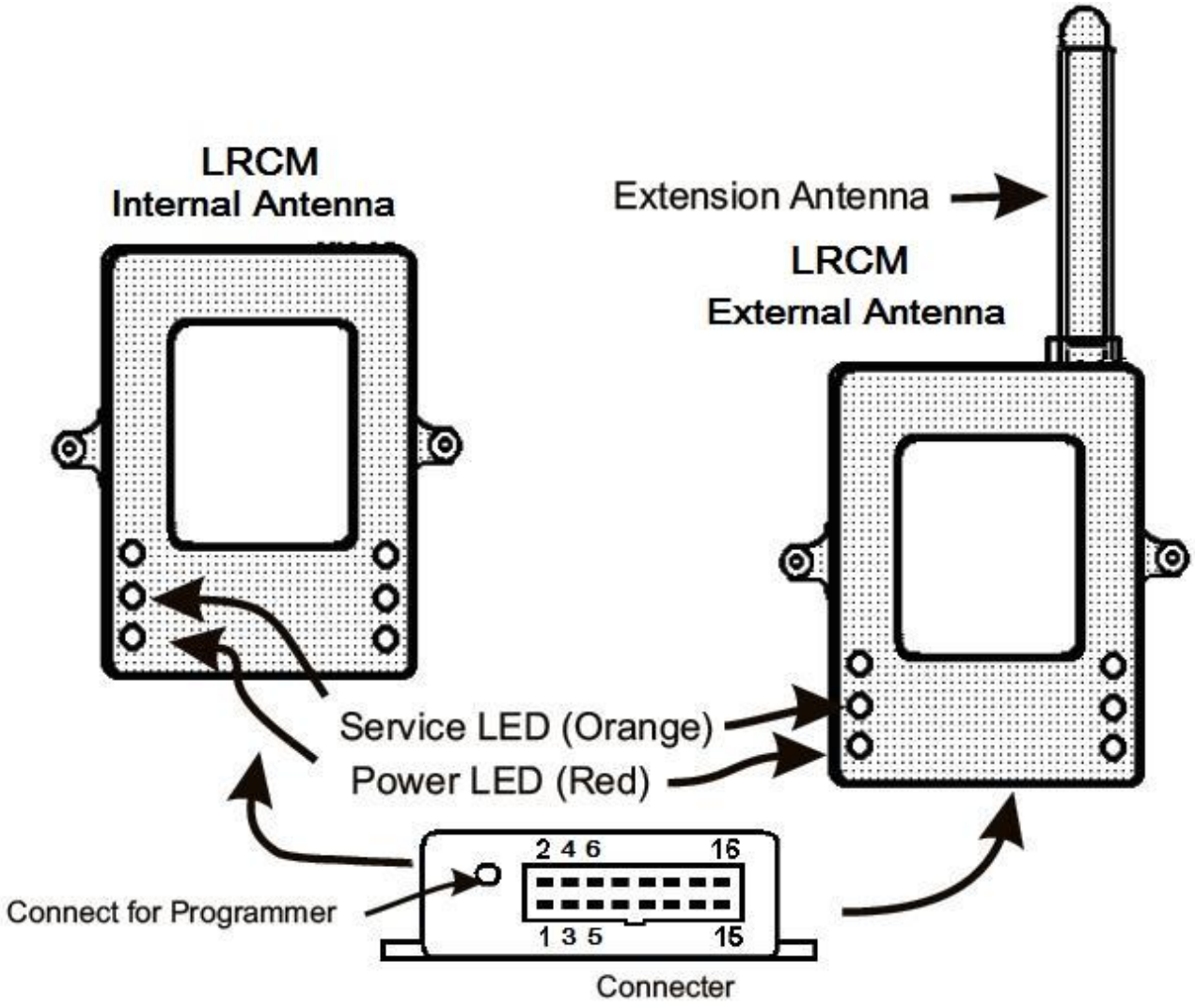
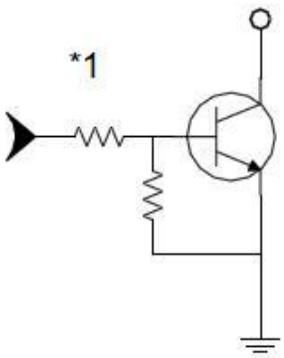
LRCM User Manual V1.0



LRCM connector pin description :

Pin 1 : D7 output *1	Pin 2 : GND
Pin 3 : D8 output *1	Pin 4 : D6 output *1
Pin 5 : D9(Relay) *1	Pin 6 : D5 output *1
Pin 7 : TXD output	Pin 8 : D4 output *1
Pin 9 : RXD input	Pin 10: D3 output *1
Pin 11: CTS input	Pin 12: D2 output *1
Pin 13: RTS output	Pin 14: D1 output *1
Pin 15: VCC (4-12V)	Pin 16: NC



*1 : Open collector output , Max sink current : 350mA

Setup hardware connection for programming software

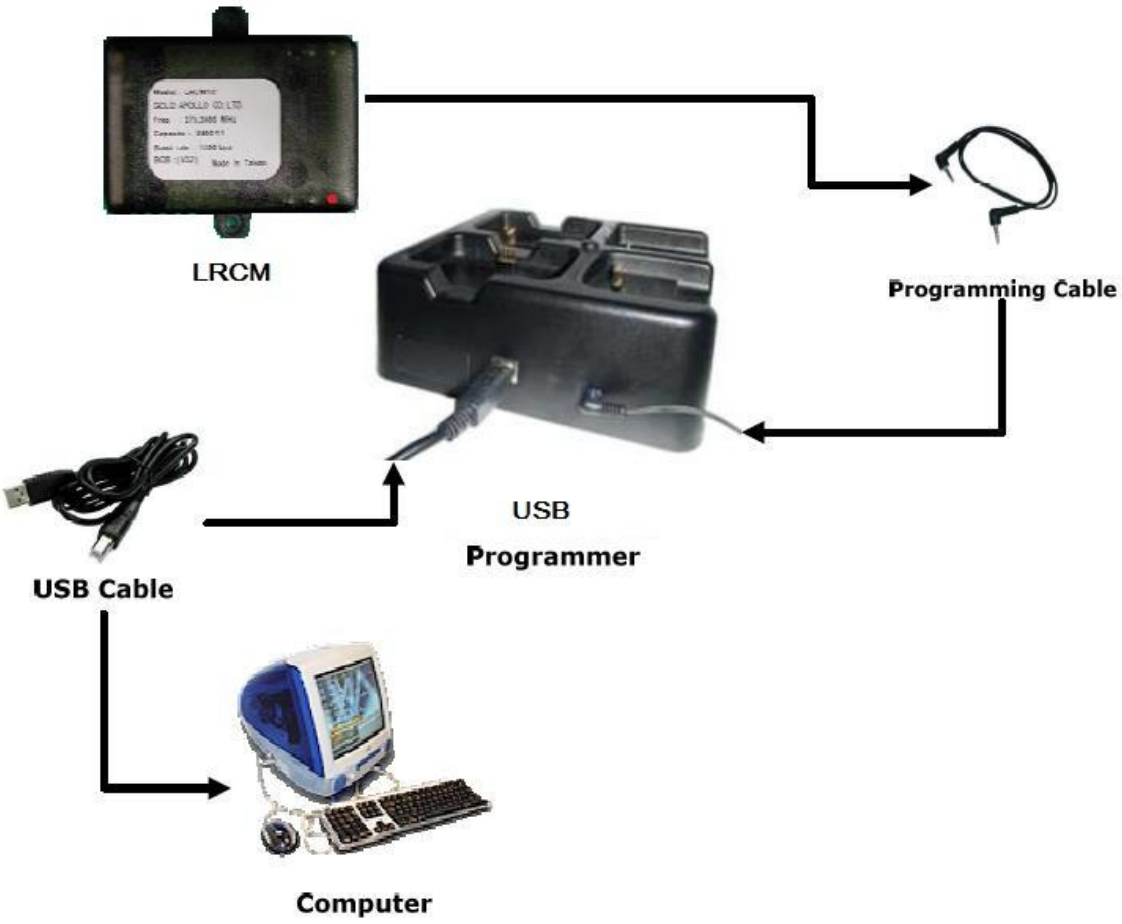
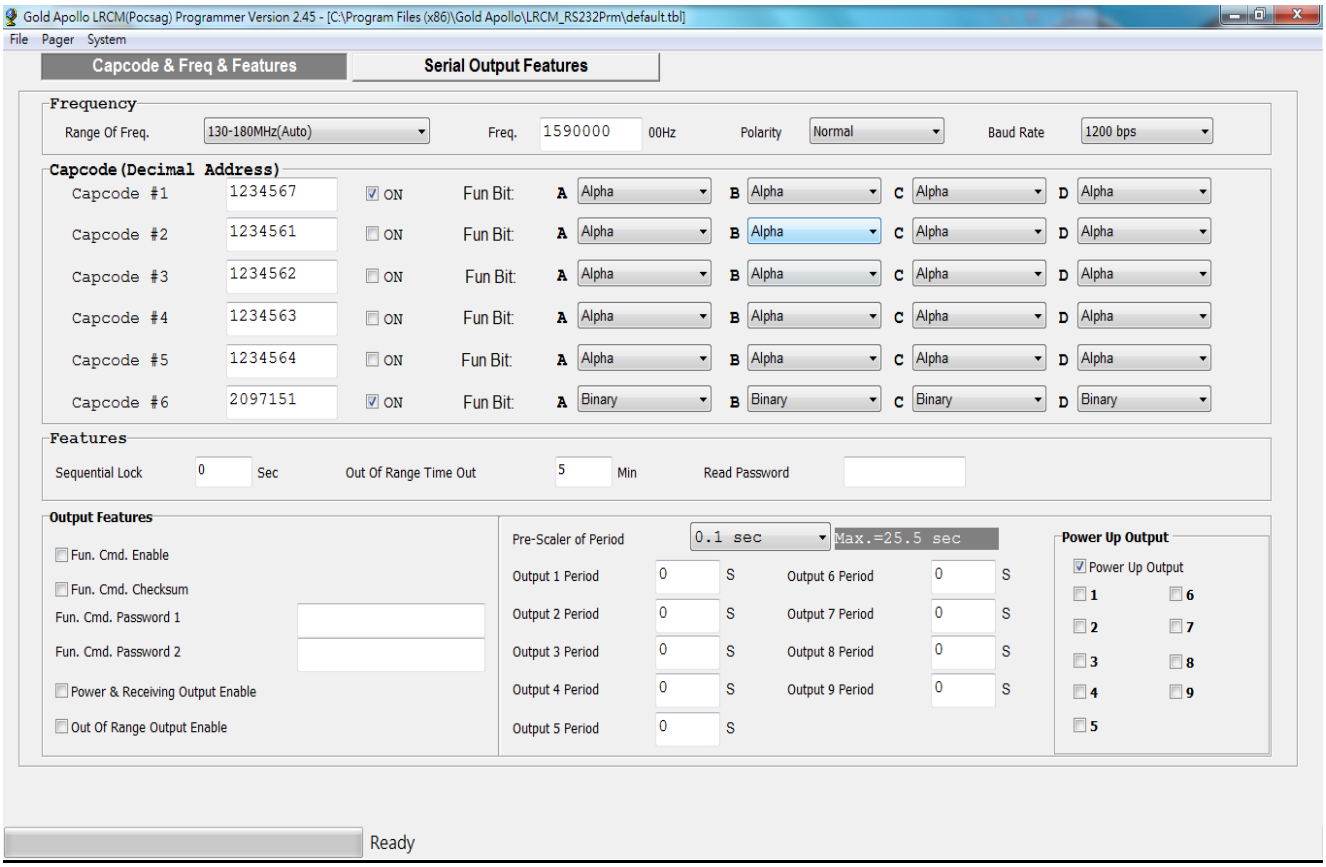
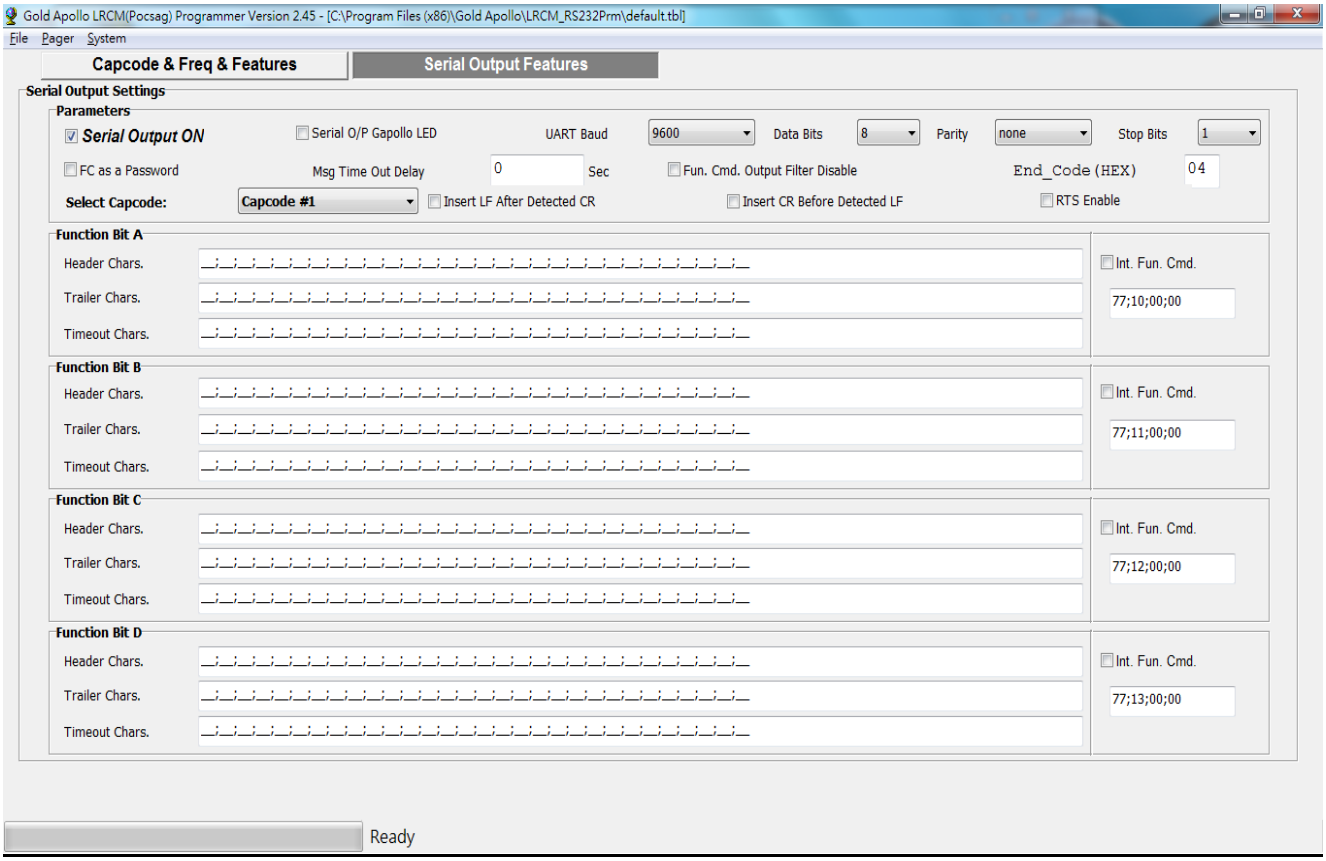


Figure Programmer Hardware Connections

Programming Software


Gold Apollo LRCM(Pocsag) Programmer Version 2.45 - [C:\Program Files (x86)\Gold Apollo\LRCM_RS232Prm\default.tbl]
File Pager System
Capcode & Freq & Features
Serial Output Features
Frequency
Range Of Freq. 130-180MHz(Auto)
Freq. 1590000 00Hz
Polarity Normal
Baud Rate 1200 bps
Capcode (Decimal Address)
Capcode #1 1234567 ON Fun Bit: A Alpha B Alpha C Alpha D Alpha
Capcode #2 1234561 ON Fun Bit: A Alpha B Alpha C Alpha D Alpha
Capcode #3 1234562 ON Fun Bit: A Alpha B Alpha C Alpha D Alpha
Capcode #4 1234563 ON Fun Bit: A Alpha B Alpha C Alpha D Alpha
Capcode #5 1234564 ON Fun Bit: A Alpha B Alpha C Alpha D Alpha
Capcode #6 2097151 ON Fun Bit: A Binary B Binary C Binary D Binary
Features
Sequential Lock 0 Sec
Out Of Range Time Out 5 Min
Read Password
Output Features
Fun. Cmd. Enable
Fun. Cmd. Checksum
Fun. Cmd. Password 1
Fun. Cmd. Password 2
Power & Receiving Output Enable
Out Of Range Output Enable
Pre-Scaler of Period 0.1 sec Max.=25.5 sec
Output 1 Period 0 S
Output 2 Period 0 S
Output 3 Period 0 S
Output 4 Period 0 S
Output 5 Period 0 S
Output 6 Period 0 S
Output 7 Period 0 S
Output 8 Period 0 S
Output 9 Period 0 S
Power Up Output
Power Up Output
1 2 3 4 5 6 7 8 9
Ready



LRCM feature Description

1. Function Command feature: (Message control output pins)

LRCM Output Control Commands are in the following format:

Function Code	Command Code	Password (option) 1- 10 Chars	Data(option)			Checksum (option)
			X1	...	X9	

Control Output Message Structure

The Function Code determines what function is going to be performed, or which control output is going to be acted upon.

The Command Code tells the logical polarity of the output, or what to do with the output referenced in the Command Code.

The Password field can be used to specify an individual *LRCM* receiver within a group of receivers configured to share a common CAP Code, or as a password used to validate output commands. Two passwords of up to 10 characters in length can be configured using the PW 1 and PW 2 serial port commands. When used as Password one can be used as an individual address and the other as a group address.

The Data field is used to simultaneously program the values of the outputs. The digital outputs are referred to as X1, X2, X3 … X9. The number in the first data field is the polarity to set X1 to. The number in the second field is the polarity to set X2 to, and so on, up through X9. The number in the field must be either a "0", a "1", or a "U". A "0" will make the corresponding output low, and a "1" will cause the LRCM to set the corresponding output high. A "U" character will leave the corresponding output unchanged.

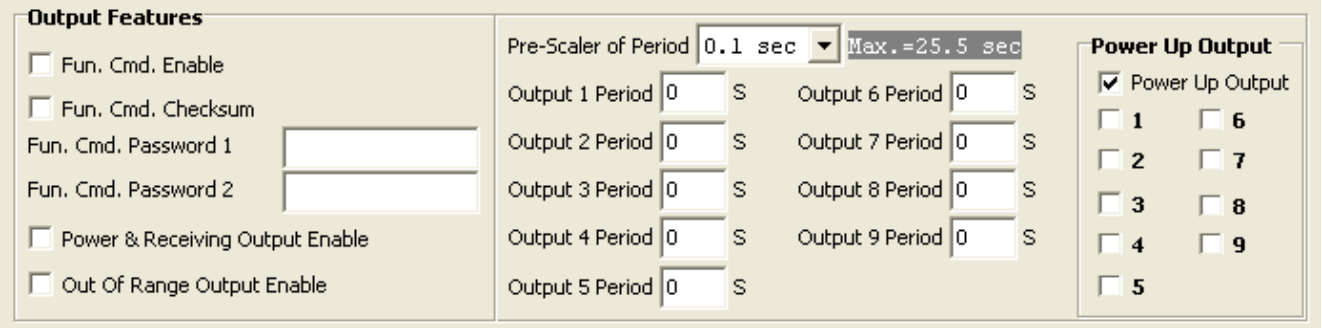
The Checksum is a bit-for-bit EXCLUSIVE OR function across every ASCII byte in the command. The result of the XOR is converted to a two-byte HEX ASCII code. See the example for details. If you do not wish to use a checksum at the end of the message, you can disable it in programming software.

Function Code	**Command Code**	**Description**
70	00	No output change
	14	Configure state of all control outputs simultaneously.
77		Control Output 1
78		Control Output 2
79		Control Output 3
7A – 7F		Control Output 4 – 9
	10	Logic 0
	11	Logic 1
	12	Cycle (logic 1 , delay , logic 0)
	13	Cycle (logic 0 , delay , logic 1)

Note : These message can be numeric or alphanumeric .

You must check the "Fun. Cmd. Enable" in programming software when you use message to control output port . Otherwise message can not control any output port .

Output Control Command parameter in the Programming software



Command Examples :

- To send a command to set control output 3(X3) high (to a 1) to a unit, the following command could be sent:

  7911

- To send a command to set all outputs high, the following command could be sent:

  7014111111111

- To send a command to set output X5 high and leave all other outputs as they were, the following command could be sent:

  7014UUUU1

Note : The data length is a variable number in 7014 command for parallel output .

- To send a command to set control output 3 high (to a 1) for one minute, and then have it go back, send the following command.

  7912

Note: The unit must have its timer already programmed to be one minute, using the Output X Period parameter in the programming software.

- To use **password** to set control output , the password follow the FC before output data , if password is 12345 then upon example will send following command

  7911**12345** and 7014**12345**111111111 and 7014**12345**UUUU1 and 7912**12345**

- **Checksum Example:**

  Message: 701412345000111000 , Function code = 70 , Command code = 14 , Password = 12345

  Data = 000111000 (turn outputs 1, 2, 3, 7, 8, 9 OFF and outputs 4, 5, 6 ON)

  Checksum: 37h XOR 30h XOR 31h XOR 34h XOR 31h XOR 32h XOR 33h XOR 34h XOR 35h XOR 30h XOR 30h XOR 30h XOR 31h XOR 31h XOR 31h XOR 30h XOR 30h XOR 30h = 02h

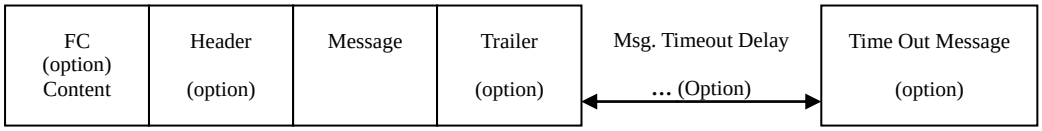
  Converting the answer, 02h, to HEX ASCII yields two characters, one for the 0 (30h) and one for the 2 (32h).

  Therefore, the actual message to send to the LRCM is :

  701412345000111000 02

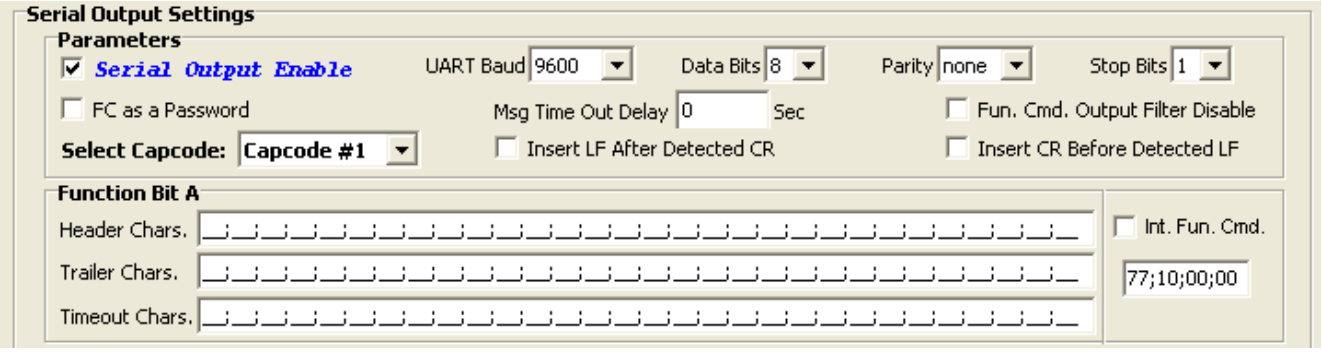
2. Serial Port Output Feature :

LRCM Serial Output is in the following format:



Serial Output Message Structure

Serial Output Settings parameter in the Programming software



The *LRCM* provides a RS-232 type serial output interface. All *non-control* messages that are received by the *LRCM* are sent out the RS-232 serial data interface in the ASCII format. For a message to be properly received it must be sent to an address that matches one of the four addresses programmed into the *LRCM*. Output control commands and serial data messages can be combined when the "Fun. Cmd. Enable" and "Serial Output Enable" both are enabled. The Output control command will be filtered on normal operation , but you can checked "Fun. Cmd. Output Filter Disable" to send out all Output control commands to monitor all messages of send to *LRCM* .
The data rate of the serial port, and its parameters, may be configured by the user. The configuration of the serial port parameters is done when the *LRCM* is programmed from the programming software.

An up to 30 character message header and trailer may be programmed into the *LRCM*, using the programming software, entered as HEX values. If a pre-programmed header and/or trailer are configured, these will be concatenated with every data message the *LRCM* sends to the serial port. If the pre-programmed header is configured, the character(s) configured will always be transmitted out the serial port immediately before the received message. If the pre-programmed trailer is configured, the character(s) will be sent out immediately after the received message. Headers and trailers will not be added to "7xxx" commands which are sent out the serial port by enabling the "Fun. Cmd. Output Filter Disable" feature in the programming software.

An up to 30 character message Timeout may be programmed into the *LRCM*, using the programming software, entered as HEX values. It will work with "Msg. Time out Delay" parameter. If the pre-programmed Timeout is configured, the character(s) configured will always be transmitted out the serial port after the received message and delay of "Msg. timeout Delay" seconds.

The Carriage Return insertion or Line Feed insertion feature may be enabled or disabled from the programming software to allow the serial output to work properly with a variety of printers. The "Insert CR before detected LF" will cause a Carriage Return to be inserted before any detected Line Feed character in the message. Similarly, the "Insert LF after deteted CR" will cause a Line Feed to be inserted after any Carriage Return in the message.

An up to 4 bytes message "Int. Fun. Cmd." may be programmed into the *LRCM*, using the programming software, entered as HEX values. It is an Internal Function Command and active when the "Fun. Cmd. Enable" is not checked.

Some paging carriers insert dashes into messages sent to numeric pagers. If this is a problem, contact your carrier and request that dashed not be inserted, or tell them to send the messages in alphanumeric format.
The *LRCM* RS-232 port is a 3-wire interface, and thus does not use hardware flow control. the RS-232 output level is CMOS 0 – 3.3V , You can use an Extension Board for drive to +/- 12V .then you can direct connect to normal RS-232 of PC .

Examples for "Fun. Cmd. Enable" and "Serial Output Enable" both be checked :

Fun. Cmd. Checksum = cs
Fun. Cmd. Output Filter Disable = lg
Header Chars = hd
Trailer Chars = tr
Timeout Chars = toms
Fun. Cmd. Password1 = pw1
Output 1 Period = x1dl
Msg TimeOut Delay = mtdl
FC as a Password = fcpw

Configuration: x1dl=60, lg=off, cs=off, pw1=ICU2, hd=28, tr=29 ,fcpw=off
Received message: "7000Hello"
Output response: none
Serial output: "(7000Hello)"
Reason : 7000 without pw1 so it is not complete FC , so it did not filter FC .

Configuration: x1dl=60, lg=off, cs=off, pw1=ICU2, hd=28, tr=29 ,mtdl=80,toms="abc", fcpw=off
Received message: "7000ICU2Hello"
Output response: none
Serial output: "(Hello)" , delay for 80 seconds then send "abc"
Reason : LRCM filter complete FC .

Configuration: x1dl=60, lg=off, cs=off, pw1=OU812, hd=28, tr=29 ,fcpw=on
Received message: "7000ICU2Hello"
Output response: none
Serial output: none
Reason : 7000 without pw1 so it is not complete FC , so it did not send out .

Configuration: x1dl=60, lg=off, cs=off, pw1=ICU2, hd=28, tr=29 ,mtdl=80,toms=”abc” ,fcpw=off

Received message: “7712ICU2Hello”

Output response: output 1 set high, delay for 60 seconds, then low

Serial output: “(Hello)” , delay for 80 seconds then send “abc”

Reason : LRCM filter complete FC .

Configuration: x1dl=60, lg=off, cs=ON, pw1=ICU2, hd=28, tr=29,fcpw=ON

Received message: “7712ICU2DEHello”

Output response: none

Serial output: none

Reason : The Checksum is wrong so it is not complete FC , so it did not send out .

Configuration: x1dl=60, lg=off, cs=ON, pw1=ICU2, hd=28, tr=29,fcpw=ON

Received message: “7712ICU26EHello”

Output response: output 1 set high, delay for 60 seconds, then low

Serial output: “(Hello)”

Reason : LRCM filter complete FC .

Configuration: x1dl=60, lg=off, cs=ON, pw1=, hd=28, tr=29,fcpw=ON

Received message: “700007Hello”

Output response: none

Serial output: “(Hello)”

Reason : LRCM filter complete FC .

Configuration: x1dl=60, lg=ON, cs=off, pw1=, hd=28, tr=29,fcpw=ON

Received message: “7014111111111Hello”

Output response: all outputs set high

Serial output: “7014111111111$^{<CR>}_{<LF>}$(Hello)”

Reason : LRCM does not filter complete FC .

Configuration: x1dl=60, lg=ON, cs=off, pw1=, hd=28, tr=29,fcpw=ON

Received message: “7014000000000”

Output response: all outputs set low

Serial output: “7014000000000000$^{<CR>}_{<LF>}$”

Reason : LRCM does not filter complete FC .

Examples for "Serial Output Enable" is checked and "Fun. Cmd. Enable" does not be checked:

Header Chars = hd Trailer Chars = tr FC as a Password = fcpw

Timeout Chars = toms Int. Fun. Cmd. = iFC

Output 1 Period = x1dl Msg TimeOut Delay = mtdl

Configuration: x1dl=60, hd=28, tr=29 , iFC= disable ,fcpw=off

Received message: "Hello"

Output response: none

Serial output: "(Hello)"

Reason : It add hd and tr to serial output .

Configuration: x1dl=60, hd=28, tr=29 ,mtdl=80,toms="abc" , iFC= disable,fcpw=off

Received message: "Hello"

Output response: none

Serial output: "(Hello)" , delay for 80 seconds then send "abc"

Reason : It add hd and tr to serial output . and wait for time out delay then output toms .

Configuration: x1dl=60, hd=28, tr=29 ,mtdl=80,toms="abc" , iFC= 0x77,0x12,0x00,0x00 and enable, fcpw=off

Received message: "Hello"

Output response: output 1 set high, delay for 60 seconds, then low

Serial output: "(Hello)" , delay for 80 seconds then send "abc"

Reason : LRCM do internal FC control command .

Configuration: x1dl=60, hd=28, tr=29 , iFC= 0x70,0x14,0xFF,0x80 and enable, fcpw=off

Received message: "Hello"

Output response: all outputs set high

Serial output: "(Hello)"

Reason : LRCM do internal FC control command .

Internal Function Command is in the following format:

First byte	Second byte	Third byte(bits)								Fourth Byte(bits)							
All bits as a Hex	All bits as a Hex	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Function Code	Command Code	Output port configuration (X1 – X9)								Option (All bits fill 0)							
70,77 – 7F	10,11,12,13,14	X 1	X 2	X 3	X 4	X 5	X 6	X 7	X 8	X 9	0	0	0	0	0	0	0

Note : 1.X1 – X9 use 1 and 0 to set output port . Function Code and Command Code same as output control command.

2.This Internal Function Command will depend on each capcode and function bits , it can set all different from every capcode and function bits .